

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

FEDERAL HOUSING FINANCE AGENCY,
AS CONSERVATOR FOR THE FEDERAL
NATIONAL MORTGAGE ASSOCIATION
AND THE FEDERAL HOME LOAN
MORTGAGE CORPORATION,

Plaintiff,

-against-

NOMURA HOLDING AMERICA INC. et al.,

Defendants.

11 Civ. 6201 (DLC)

CORRECTED AMENDED DIRECT TESTIMONY OF G. WILLIAM SCHWERT

I, G. William Schwert, declare as follows:

1. I am the Distinguished University Professor of Finance and Statistics at the William E. Simon Graduate School of Business Administration of the University of Rochester, a position I have held since 1998. I have been a faculty member at the University of Rochester since 1976. I teach courses and conduct research in corporate finance, capital markets, and statistics. In 1975-76, I was an Assistant Professor of Finance at the University of Chicago, and in 1982 I was the Center for Research in Security Prices Distinguished Scholar and Visiting Associate Professor at the University of Chicago. Doctoral students I have supervised are now tenured, chaired faculty members at Harvard, Dartmouth, Chicago, Wharton, Northwestern, and Michigan, among other schools.

2. In addition to my teaching responsibilities, I have been a Research Associate of the National Bureau of Economic Research since 1988. I have been the Managing Editor of the Journal of Financial Economics since 1995, where I have been an Editor since



1979. I was an Associate Editor of the Journal of Finance from 1983-2000. I have also served as a Director of the American Finance Association from 1987-89 and as the Chair of the Business and Economics Section of the American Statistical Association in 1990.

3. My curriculum vitae, **Plaintiff's Exhibit ("PX") 1330**, lists my publications and other professional accomplishments.

I. ASSIGNMENT AND SUMMARY OF CONCLUSIONS

4. I was retained by counsel for the Federal Housing Finance Agency ("FHFA") to analyze the economic evidence concerning the relation between the reported characteristics of underlying loan collateral and the subordination level(s) of the AAA-rated private-label residential mortgage-backed securities the Federal National Mortgage Association ("Fannie Mae") and the Federal Home Loan Mortgage Corporation ("Freddie Mac") (collectively the "Government Sponsored Enterprises" or the "GSEs") purchased. In connection with this assignment, I have been assisted by members of the professional staff of Compass Lexecon, an economics consulting firm, working under my supervision. After completing that assignment, I submitted a written report setting forth my analysis and conclusions on July 9, 2014.

5. To perform my analysis, I reviewed relevant academic literature and ratings agency publications, and conducted my own statistical analysis. My statistical analysis, which is consistent with the findings of published studies, shows that there is a significant relation between AAA subordination levels and the reported characteristics of the underlying collateral, including loan-to-value ratios ("LTV") ratios and occupancy status, in securitizations that the GSEs participated in as purchasers. My analysis also shows that there is a significant relation between super-senior subordination levels and AAA subordination levels in these transactions.

6. Each of the private-label residential mortgage-backed securities (the “GSE Certificates”) issued to the GSEs in connection with seven Nomura-sponsored securitizations (the “Securitizations”) at issue in this matter was rated as AAA (or its equivalent) by one or more of the major ratings agencies. My findings imply that misrepresentations about the reported characteristics of the loans in the supporting loan groups would have affected the subordination levels of the GSE Certificates, and support Plaintiff’s claims that the alleged misrepresentations were material. In particular, if the Prospectus Supplements for the Securitizations had reported higher LTV ratios, and higher percentages of properties not occupied by their owners, the GSE Certificates would likely have had higher subordination levels. Moreover, the GSE Certificates that were not super-senior could have been issued with AAA ratings, if at all, only if the subordination levels had been higher than the subordination levels at which those GSE Certificates were in fact issued.

7. My analysis focuses on alleged misrepresentations that are quantifiable, such as LTV ratios and owner occupancy. It cannot accurately quantify the effects of LTV ratios that are far outside the range of data reported in prospectuses for the GSE Transactions, as alleged in this case. It also cannot quantify the effects of failures to comply with underwriting guidelines, as alleged in this case. Finally, it also cannot quantify the effects of disclosure of false information that has been alleged in this case. In my opinion, all of these factors would have further increased the level of subordination required to achieve AAA ratings, if the securities could have been issued at all.

II. THE ECONOMICS OF SUBORDINATION

8. As the name suggests, a mortgage-backed security (or “MBS”) is a security backed by a pool of mortgages (which is sometimes called the supporting loan group). Collateralized mortgage obligations (or “CMOs”) are structured mortgage-backed securities that

direct the cash flows from the supporting loan group to separate tranches of securities that have varying characteristics, thereby allowing investors with different investment objectives and risk tolerances to invest in the MBS market. Any deal that is not securitized under an agency or GSE shelf is considered to be a “private-label” securitization, as the issuing entity has no connection to the U.S. government (either explicit or implicit). The convention in the markets is to refer to transactions backed by non-prime loans as mortgage-related asset-backed securities or mortgage ABS.

9. Since private-label securitizations such as the GSE Certificates are not backed by the government or the GSEs, alternative forms of credit enhancement must be used to create highly-rated securities. The most common method of providing credit enhancement is subordination, which means that some of the securities issued in the deal are subordinate or “junior” to other securities issued in the transaction in priority of cash flows, and are the first to absorb non-recoverable losses, to protect the more “senior” tranches. The subordinate (also sometimes called mezzanine) tranches are commonly different classes of securities, each with different ratings (typically ranging from double-A to unrated) and with greater exposure to credit losses. Private-label securitizations are also frequently over collateralized at issuance (*i.e.*, the principal value of the debt securities issued is smaller than the aggregate principal value of the underlying loans), which lends additional credit support to the senior securities (and some support for the junior securities). Both greater subordination and overcollateralization at issuance provide protection against losses to senior securities, since principal losses from defaults are allocated to more junior securities first.

10. The impact of subordination, over-collateralization and other credit enhancements on the distribution of the risk of a loan portfolio can be significant. For example,

bonds backed by subprime mortgages issued in 2006 that were rated Aaa by Moody's were structured on average to withstand a total loss on the underlying mortgage pool of approximately 26 to 30 percent without defaulting.

11. The ratings agencies assigned ratings to the senior and subordinate tranches of any private-label mortgage-backed securitizations based on their assessment of the likelihood and anticipated severity of losses, which, in turn, depended on the reported characteristics of the underlying loans, among other things. The MBS rating process involves a combination of formal statistical modeling based on econometric default models (which use as inputs loan characteristics and other variables) and subjective judgment. Nevertheless, when performing their analyses, the rating agencies relied on the accuracy of the data provided to them by issuers, underwriters and others.

12. The ratings agencies have stated that LTV ratios of the underlying loans affect both the probability that a borrower will default and the severity of loss in the event of default. *See, e.g.,* Moody's Investors Service, *Moody's Mortgage Metrics: A Model Analysis of Residential Mortgage Pools*, April 1, 2003, at 6 ("Borrower equity is an important buffer against default risk and a cushion against loss where a default occurs.") (PX 1316); Standard & Poor's, *U.S. Residential Subprime Mortgage Criteria: Credit Analysis for Subprime Loan Transactions*, September 1, 2004, at 3 ("LTVs historically have proven to be key predictors of foreclosure rates") (PX 1318). The ratings agencies have also stated that occupancy status of the underlying loans affects default risk because borrowers are more likely to make the required payments on a mortgage that is secured by their primary residence, and because the income expected from an investment property may not materialize. These statements are consistent with academic studies, which have found that both LTV ratios and occupancy status significantly affect credit risk. For

example, Yuliya Demyanyk and Otto Van Hemert, in “Understanding the Subprime Mortgage Crisis,” 24 *The Review of Financial Studies* (2011) 1848-80, at 1862 (Table 3) (**PX 1405**), found that the combined LTV ratio has a positive and statistically significant effect on the likelihood that a securitized subprime mortgage loan will become delinquent, and that investor loans have higher default probabilities.

13. In light of these statements and findings, it is not surprising that academic studies also have found that LTV ratios and occupancy status are important determinants of AAA subordination levels. Demiroglu and James (2013) analyzed a sample of 474 Alt-A mortgage-backed securitizations completed during the period from 2003 to 2007. *See* Cem Demiroglu and Christopher James, “How Important is Having Skin in the Game? Originator-Sponsor Affiliation and Losses on Mortgage-Backed Securities,” 25 *The Review of Financial Studies* (2012) 3217-3258 (**PX 1404**). Among other things, they analyzed the relation between AAA subordination and various explanatory variables, including LTV and occupancy status, using aggregate deal-level data. These researchers found that higher LTV ratios are associated with higher levels of AAA subordination and that higher owner occupancy percentages are associated with lower levels of AAA subordination.

14. Begley and Purnandam (2013) analyzed a random sample of 163 private-label securitizations from 2001-02 and 2005 covering a wide range of sponsors and originators, which they considered to be a representative and economically meaningful sample. *See* Taylor A. Begley and Amiyatosh K. Purnanandam, “Design of Financial Securities: Empirical Evidence from Private-Label RMBS Deals” (August 2, 2013) (**PX 1403**). Among other things, they analyzed the relation between AAA subordination and certain observable credit risk factors, including LTV ratio. These researchers found that securitizations have relatively larger AAA-

rated tranches when they are supported by mortgage loan pools that have lower observable credit risk in general and that higher LTV ratios in the supporting loan group are associated with higher levels of AAA subordination in particular.

III. MY STATISTICAL ANALYSIS OF THE DETERMINANTS OF AAA SUBORDINATION IN SECURITIZATIONS IN WHICH THE GSES PURCHASED SECURITIES

15. I used methods similar to those used by Demiroglu and James (2012) (PX 1404) and Begley and Purnandam (2013) (PX 1403) to analyze the determinants of AAA subordination levels in a sample of private-label residential mortgage-backed securitizations in which certificates from one or more AAA-rated tranches were sold to Fannie Mae or Freddie Mac.

A. Data Analyzed

16. Using data provided by Fannie Mae and Freddie Mac, I analyzed a subset of publicly offered, private-label residential mortgage-backed securities that they purchased and were issued during the period from 2005 to 2007, which I refer to as the “GSE Transactions.” The GSE Transactions include 1,319 different securities issued in 990 different securitizations.

17. In many of the GSE Transactions, the underlying mortgage loans were separated into two or more supporting loan groups (or “SLGs”), with loans in a particular supporting loan group (the primary “SLG”) providing the primary support for particular tranches of the securitization, and loans in the other supporting loan group(s) providing secondary support for those particular tranches of the securitization (and primary support for other tranches of the securitization). As an example, consider the Nomura Home Equity Loan, Inc. Home Equity Loan Trust, Series 2006-FM1 (“NHELI 2006-FM1”) securitization (PX 00049). In this securitization, the underlying mortgage loans were divided into two supporting loan groups, and the securities issued were divided into two groups. “Group I Mortgage Loans” consisted of

mortgage loans with principal balances at origination that conformed to the GSEs' conforming loan limits, whereas the "Group II Mortgage Loans" consisted of mortgage loans that did not necessarily conform to the GSEs' conforming loan limits. The "Group I Certificates" would receive distributions primarily from amounts received from the Group I Mortgage Loans, whereas the "Group II Certificates" would receive distributions primarily from amounts received from the Group II Mortgage Loans. However, the Group I Certificates may receive distributions from amounts received from the Group II Mortgage Loans, but only after certain amounts are distributed to the Group II Certificates, and vice versa. Thus, the Group I Certificates were supported by two supporting loan groups.

18. My team and I obtained additional data concerning the GSE Transactions from several recognized independent data sources. First, we obtained data concerning the reported characteristics of the loans in the underlying supporting loan group(s) from CoreLogic. Second, we obtained data concerning the characteristics of the securities and their ratings at issuance from ABSNet and Bloomberg. Finally, in cases where data were missing or there was a discrepancy between data sources, we obtained data from prospectus supplements. By combining and processing these data, we created a database that consisted of 988 securitizations for which we had data concerning the characteristics of the securities and their ratings at issuance. For 974 of these 988 securitizations (which were backed, collectively, by 1,088 supporting loan groups) we obtained sufficient data concerning the loans in the supporting loan groups to perform the regression analyses described below. **Plaintiff's Exhibit 1407** provides a detailed description of the underlying data and identifies the data sources used.

B. Deal and Pool Level Analysis of AAA-Rated Subordination Levels

19. Similar to Demiroglu and James (2012) (**PX 1404**) and Begley and Purnandam (2013) (**PX 1403**), I estimated least squares regressions in which the AAA

subordination level is the dependent variable and the explanatory (or independent) variables include various aggregate mortgage characteristics, pre-deal house price run-up and vintage indicator variables. A least squares regression is a standard statistical procedure that is used to estimate the relation between a dependent variable and one or more independent variables.

20. I estimated least squares regressions for the GSE Transactions using both aggregate *deal-level* data and aggregate *pool-level* data. In the deal-level regressions, AAA subordination and the aggregate mortgage characteristics are measured at the deal level (*i.e.*, using data for all supporting loan groups and all securities in the deal); whereas in the pool-level regressions, AAA subordination and the mortgage characteristics are measured at the pool level (*i.e.*, using data for the primary supporting loan group and the securities backed primarily by that supporting loan group).

21. I calculated AAA subordination by subtracting from 1 the ratio of (a) the sum of the face value of non-notional securities with an AAA rating to (b) the sum of the face value of all mortgages underlying the pool or deal. Thus, AAA subordination reflects the subordination level of the most junior AAA-rated tranche in the transaction. (Any more junior rated tranche had a lower rating.)

22. I considered two different specifications for these regressions: a linear specification and a non-linear interactive specification. In the **linear specification**, the independent variables include (a) the weighted average LTV ratio (*i.e.*, the loan balance weighted average loan-to-value ratio of mortgages in the supporting loan group), and (b) the non-owner-occupied percentage (*i.e.*, the total balance of mortgages to properties not primarily occupied by the borrower divided by the total balance of all mortgages in the supporting loan group). The linear specification does not allow for the possibility that the effects of changes in

LTV on AAA subordination vary with the level of LTV or the possibility that the effects of LTV on AAA subordination depend on occupancy status.

23. In the **non-linear interactive specification**, I include independent variables concerning the percentage of loans in the supporting loan group in each of five mutually exclusive categories based on occupancy status and LTV ratio. The five categories are: (a) owner-occupied with an LTV ratio of 80% or less, (b) owner-occupied with an LTV ratio above 80% but not above 100%, (c) owner-occupied with an LTV ratio above 100%, (d) not owner-occupied with an LTV ratio of 80 or less, and (e) not owner-occupied with an LTV ratio above 80%. This specification allows for non-linear and interactive effects.

24. In both the linear and non-linear interactive models, I include several other independent variables to control other factors that may affect AAA subordination. These additional variables include loan pool characteristics (*e.g.*, average FICO score), and security characteristics (*e.g.*, a bond insurance indicator), and are described in **Plaintiff's Exhibit 1406** (Appendix Table 1).

1. Results of linear specification.

25. **Plaintiff's Exhibit 1408** (Schwert Affirmative Report Exhibit C) reports my findings for the linear model. I find a positive and statistically significant relation between the average LTV ratio and AAA subordination at both the deal level and the pool level, which implies that LTV ratios are an important determinant of AAA subordination. The coefficient of 0.294 in the pool-level regression indicates that a 10 percent increase in the average LTV ratio of the primary supporting loan group (from, say, 80 percent to 90 percent) would be associated with a 2.94 percent increase in the AAA subordination level (from, say, 20 percent to 22.94 percent), on average. The coefficient of 0.401 in the deal-level regression indicates that a 10 percent increase in the average LTV ratio of the supporting loan groups (from, say, 80 percent to 90

percent) would be associated with a 4.01 percent increase in the AAA subordination level (from, say, 20 percent to 24.01 percent), all else equal.

26. I also find the expected positive relation between the non-owner occupancy percentage and AAA subordination, which is statistically significant in the pool-level regression, but not in the deal-level regression. The coefficient of 0.014 in the pool-level regression indicates that a 10 percent increase in the not owner-occupied percentage of the primary supporting loan group (from, say 30 percent to 40 percent) would be associated with a 0.14 percent increase in the AAA subordination level (from, say, 20 percent to 20.14 percent), on average. The coefficient of 0.016 in the deal-level regression indicates that a 10 percent increase in the not owner-occupied percentage of the supporting loan groups (from, say 30 percent to 40 percent) would be associated with a 0.16 percent increase in the AAA subordination level (from, say, 20 percent to 20.16 percent), all else equal.

2. Results of non-linear interactive specification.

27. **Plaintiff's Exhibit 1409** (Schwert Affirmative Report Exhibit D) reports my findings for the non-linear interactive model. To ascertain whether there is a statistically significant relation between the LTV/occupancy category of the loans in the supporting loan group and AAA subordination levels, I performed a statistical test of the joint hypothesis that all of the coefficients on the LTV/occupancy variables are zero (*i.e.*, that neither LTV ratios nor occupancy status affect AAA subordination levels).¹ As the exhibit shows, I can reject this hypothesis. The finding that these coefficients differ from zero implies that LTV ratios and occupancy status are important determinants of AAA subordination levels.

1. This is a well-known, widely-used standard statistical test known as an "F-test."

28. The non-linear interactive regression model does not include as an independent variable the percentage of loans in the “Owner, LTV = 80 and Below” category. Therefore, the coefficients on the included occupancy status/LTV ratio variables reflect the effect of loans being in the indicated category instead of the omitted category. For example, the coefficient of 0.070 on the “Owner, $80 < \text{LTV} \leq 100$ ” variable in the pool-level regression means that if the percentage of loans in that category increased by 20 percent (*i.e.* from, say, 10 percent to 30 percent), and the percentage of loans in the “Owner, LTV = 80 and Below” category decreased by 20 percent, the expected AAA subordination level would increase by 1.40 percent (from, say, 20 percent to 21.40 percent).

29. The individual coefficient estimates in **Plaintiff’s Exhibit 1409** (Schwert Affirmative Report Exhibit D) provide some evidence of non-linear and interactive effects. In particular, the estimated coefficients in each of the occupancy status category typically increase as the LTV ratio increases, implying that the effect of increases in LTV ratios on AAA subordination increase as the LTV ratio increases. Moreover, the coefficient on “Not Owner-Occupied, LTV = 80 and below” is positive in both regressions, implying that loans on non-owner-occupied properties in this LTV ratio category are perceived as riskier than loans on owner-occupied properties in this LTV ratio category.

C. Analysis of Super-Senior Subordination Levels

30. Some private-label securitizations have multiple AAA-rated tranches with different payment priorities supported by a particular loan group. The more junior tranches receive principal payments only after the highest-priority tranche (generally called the “super-senior tranche”) is paid. In 358 of the 988 securitizations for which I obtained subordination and ratings data, there were one or more super-senior tranches backed by the supporting loan group that supported the securities the GSEs purchased. In 151 of these 358 securitizations, the GSEs

purchased securities from the most junior AAA-rated tranche, and in the remaining 207 securitizations, the GSEs only purchased AAA securities from more senior tranches.

31. The GSEs purchased one certificate in each of the seven Securitizations at issue in this case. In six of the seven Securitizations, the security purchased by the GSE was the only AAA-rated tranche (*i.e.*, there was no super-senior tranche) backed by the relevant supporting loan group. In the one remaining Securitization, NAA 2005-AR6, there was a super-senior tranche backed by the relevant supporting loan group, and the GSE purchased securities from that tranche. **Plaintiff's Exhibit O0059**, Nomura Asset Acceptance Corporation, Alternative Loan Trust, Series 2005-AR6 Prospectus Supplement dated November 29, 2005, at S-5 and S-9, states that "[t]he Class II-A-2, Class III-A-2, Class IV-A-2 and [s]ubordinate [c]ertificates have a greater risk of loss than the Class I-A, Class II-A-1, Class III-A-1 and Class IV-A-1 Certificates".

32. Because one of the GSE Certificates came from a super-senior tranche rather than the most junior AAA-rated tranche, I analyzed the relation between the super-senior subordination level and the AAA subordination level in the 358 securitizations with super-senior tranches discussed above. As **Plaintiff's Exhibit 1410** (Schwert Affirmative Report Exhibit E) shows, there is a positive and statistically significant linear relation between the super-senior subordination level and the AAA subordination level in these transactions that varies with Intex asset type. For example, if the AAA subordination level was 0.20 (*i.e.*, 20 percent) in a transaction with an Intex asset type of Subprime, the expected super-senior subordination level would be approximately 0.348 (*i.e.*, 34.8 percent). In light of the relation between super-senior subordination levels and AAA subordination levels, I conclude that factors that affected AAA subordination levels also affected super-senior subordination levels.

D. Conclusion

33. My analyses show that there is a significant relation between AAA subordination levels of those securitizations and the reported characteristics of the underlying loan collateral, including LTV ratios and occupancy status. I also found a significant relation between super-senior subordination levels and AAA subordination levels in those securitizations. These findings imply that misrepresentations about LTV ratios and occupancy status would have affected the subordination levels of the GSE Certificates, and support Plaintiff's claims that the alleged misrepresentations were material. Moreover, if the prospectus supplements for the Securitizations had reported higher LTV ratios and higher percentages of properties not occupied by their owners, the GSE Certificates that were not super-senior could have been issued with AAA ratings, if at all, only if the subordination levels had been higher than the actual subordination levels of those GSE Certificates.

IV. RESPONSE TO PROFESSOR RIDDIOUGH'S REBUTTAL REPORT

34. After I submitted my initial report, Defendants submitted the Rebuttal Expert Report of Timothy J. Riddiough, Ph.D., November 7, 2014 ("Riddiough Report") that, among other things, criticizes certain aspects of my initial report. I have been asked by FHFA's counsel to respond to these criticisms.

A. Professor Riddiough's Claim that My Regression Model "Does Not Allow One to Conclude that a Change in Subordination Levels Would Change the Certificate's Rating"

35. Professor Riddiough claims that my analysis "assumes ... that the subordination levels of the At-Issue Certificates were precisely at the margin of the AAA/AA rating" even though "it is entirely possible that the At-Issue Certificates were issued with a higher subordination level than was necessary to secure a AAA rating, *i.e.*, the issued subordination level was established above the credit rating margin" and that "changes in the

characteristics of the collateral might very well have no effect on the credit rating of the At-Issue Certificates.” Riddiough Report, ¶¶ 128-29. I have several responses to this criticism.

36. First, my conclusion that the GSE Certificates would have had higher levels of subordination if the Prospectus Supplements had reported higher LTV ratios, and higher percentages of properties not occupied by their owners is based on the findings of my regression analyses and does not depend on whether a reduction in the subordination level would have changed the certificate’s ratings.

37. Second, because the issuers of the Securitizations had an economic incentive to maximize the size of the AAA-rated tranche(s) in any particular offering (which had lower required returns than other tranches) to maximize the proceeds from the offering, it is reasonable to believe that the observed AAA subordination levels were near the AAA/AA margin. Therefore, it is reasonable to believe that the most junior AAA-rated tranche would not have received a AAA rating if there was an increase in the perceived risk of the underlying loans that was not accompanied by an offsetting increase in the subordination level of that tranche.

38. Furthermore, the AAA/AA margin for any particular securitization must necessarily fall between the subordination level of the most junior AAA-rated tranche and the subordination level of the most senior AA-rated tranche of that securitization. ~~That difference ranged from 1.3 to 5.1 percent for the Securitizations, and represents the upper bound on the change in the required subordination level that would necessarily result in a change in rating.~~

B. Professor Riddiough’s Claim that My Analysis “Does Not Account for the Fact that Ratings Also Depend on Independent Judgment”

39. Professor Riddiough claims that my analysis “does not account for the fact that ratings also depend on independent judgment, not just modeling.” Riddiough Report, § IX.B.2. This claim is incorrect, as I specifically stated in my report that the ratings process

“involves a combination of formal statistical modeling based on econometric default models (which use as inputs loan characteristics and other variables) and subjective judgment.” Schwert Report, n. 21. Moreover, my statistical analysis does not make any assumption about the nature of the ratings process as my regressions analyze the relation between the outcome of the ratings process (*i.e.*, the observed level of AAA subordination) and various factors including the reported characteristics of underlying loan collateral, not the ratings process itself.

C. Professor Riddiough’s Claim that My Analysis “Does Not Account for the Fact that Ratings Depend on Other Types of Credit Enhancement”

40. Professor Riddiough criticizes me for “only address[ing] subordination and overcollateralization” and “not account[ing] for the fact that ratings depend on other types of credit enhancement” such as excess spread. Riddiough Report, § IX.B.3; ¶ 134. I have several reactions to this criticism.

41. First, neither Demiroglu and James (2012) nor Begley and Purnandam (2013) include excess spread or any other measure of credit enhancement in their regression analyses. Moreover, to my knowledge, there is no standard or recognized ex-ante measure of excess spread that could be included in a regression analysis (and Dr. Riddiough does not identify one). Finally, Dr. Riddiough does not establish that including excess spread in the analysis would change my results in any material way. Professor Riddiough asserts that omitted variable bias is introduced when potential explanatory variables are not included in a regression model. Riddiough Report, n. 128. But this assertion is incorrect: omitted variable bias only occurs when the omitted variables are correlated with the included variables. Professor Riddiough does not demonstrate any such correlation.

D. Professor Riddiough's Claim that My Statistical Analysis Provides an "Insufficient Statistical Basis to Claim that the Deals and Pools Would Have Had Different Subordination Levels . . . If the Purported True Loan Characteristics Had Been Reported"

42. Professor Riddiough "construct[s] a 95 percent confidence interval for the AAA subordination levels predicted by [my regression] model condition on the purported true characteristics of each At-Issue deal and pool (for both the linear and non-linear models) and examine[s] whether the actual AAA subordination level falls with the confidence interval."

Riddiough Report, ¶ 138. "If the actual AAA subordination level of a deal or pool falls within the 95 percent confidence interval of that deal or pool, then [Professor Riddiough] conclude[s] that the At-Issue deal or pool AAA subordination levels were sufficiently high so as to, from a statistical perspective, not merit a reduction in credit rating according to [my] model, even given the purported true measures of LTV and occupancy status." *Id.* Professor Riddiough's conclusion is incorrect because the method he uses to assess statistical significance is incorrect. The proper assessment of statistical significance depends on the statistical significance of the coefficients on the relevant variables in the regression model, not on any analysis of prediction intervals for individual observations used to estimate the regression model. Not surprisingly, Professor Riddiough does not cite any authoritative text that supports the method he uses to purportedly assess statistical significance.

43. Each of Professor Riddiough's exhibits, **Nomura Defendants' Exhibits ("DX") 1072-77** (Riddiough Exhibits 20A, 20B, 21A, 21B, 21C, 21D), show that "predicted AAA Subordination based on purported true measures" exceeds "predicted AAA subordination based on disclosed measures" using each of my regression models and purported "true" measures of LTV and occupancy status determined using the extrapolation method of Dr. Charles Cowan and the findings of Mr. Robert Hunter and Mr. John Kilpatrick (FHFA's

sampling, reunderwriting, and valuation experts, respectively). These findings, therefore, support FHFA's claim that the misrepresentations concerning LTV and occupancy status were material.

44. Nevertheless, Professor Riddiough's calculations based on the estimated coefficients from my regressions should be regarded as conservative estimates of the impact of the alleged misrepresentations and omissions on subordination levels for three reasons. *First*, my regression models will not provide reliable estimates of required subordination ratios when the true characteristics of the supporting loan groups fall outside the range of the observed data for the GSE Transactions on which the models are estimated. Yet, Plaintiff's reunderwriting experts' findings imply that the true characteristics of the underlying loans do fall outside the range in certain respects (e.g., a large fraction of the loans had true LTVs in excess of 100%). *Second*, my model does not assess the impact of the alleged misrepresentations concerning compliance with underwriting guidelines would have on subordination, but misrepresentations relating to compliance with underwriting guidelines that caused the ratings agencies to overstate the ability of borrowers to repay their loans necessarily would affect subordination levels. *Finally*, my analysis does not assess the impact that a disclosure that the information provided in the prospectuses was false would have on subordination, but such a disclosure also would be likely to affect subordination levels.

V. REBUTTAL OF PROFESSOR VANDELL'S LOAN PERFORMANCE ANALYSIS BASED ON PLAINTIFF'S REUNDERWRITING RESULTS

45. I was also asked by FHFA's counsel to review and evaluate certain statistical analyses contained in the expert report of Defendants' expert, Kerry D. Vandell, submitted on July 9, 2014 ("Vandell Report"). After completing this assignment, I submitted a rebuttal report setting forth my analysis and conclusions on November 10, 2014. I understand

that the Court entered an order on February 10, 2015 excluding Professor Vandell's testimony and opinions related to his benchmarking analyses. Accordingly, my rebuttal testimony focuses on Professor Vandell's purported evaluation of "whether loans identified by Mr. Hunter [] as defective ["Hunter Defective Loans"] performed any differently in terms of serious delinquencies and defaults than loans identified by Mr. Hunter as not defective" (*i.e.*, the one statistical analysis that Professor Vandell performed that did not rely on the excluded benchmarks). Vandell Report ¶ 222 . Based on his analysis, Professor Vandell concluded that "after accounting for disclosed loan characteristics and market changes, there was no statistically significant difference in default and serious delinquency rates," indicating to him "that either Plaintiff's reunderwriting findings are not reliable, or that any defects were not material to the defaults and serious delinquency rates experienced by loans in the At-Issue SLGs." *Id.* In his direct testimony, Professor Vandell also claims that this demonstrates "that the losses allegedly suffered by the At-Issue Certificates were not caused by any of these alleged defects." Vandell Direct ¶ 16. As I demonstrate below, Professor Vandell's conclusions are based on a fundamentally flawed analysis and are incorrect.

A. Professor Vandell Misinterprets His Own Findings

46. To conduct his analysis, Professor Vandell relied on a "multinomial cross sectional logit" model. This multinomial model estimates how the independent variables included in the model affect (a) the likelihood of *default* relative to remaining current, and (b) the likelihood of *prepayment* relative to remaining current. In interpreting the results of a multinomial model, it is important to recognize that the effect of any variable on the default rate depends on how that variable affects both the likelihood of default (relative to remaining current) and the likelihood of prepayment (relative to remaining current). Prepayments affect default rates because loans that are prepaid cannot default, but loans that are not prepaid can default.

Therefore, loan defects could result in higher default rates by increasing the likelihood of default, decreasing the likelihood of prepayment, or both, relative to remaining current. Moreover, even if loan defects did not increase the *likelihood* of default, loan defects could result in higher default *rates* by reducing the likelihood of prepayment.

47. **DX 1089** (Vandell Ex. 67, Updated) purportedly provides the estimates of Professor Vandell's multinomial cross-sectional logit model using the loans reviewed by FHFA's reunderwriting expert, Mr. Hunter (the "Hunter Sample"). Professor Vandell claims that these estimates show "that after accounting for disclosed loan characteristics and market changes, there was no statistically significant difference in default and serious delinquency rates," Vandell Report ¶ 222, apparently because the coefficient on the Hunter Defective Loan Indicator, while positive, is not statistically significant and because the estimated "Effect of Hunter Defect on Probability of Default and Serious Delinquency" for each of the At-Issue SLGs is not statistically significant. However, **DX 1089** (Vandell Ex. 67, Updated) only reports the estimates of the effect of underwriting defects on the likelihood of default relative to remaining current. As explained above, one cannot evaluate the impact of underwriting defects on default rates without also taking into account the effect of underwriting defects on the likelihood of prepayment relative to remaining current. Thus, **DX 1089** (Vandell Ex. 67, Updated) does not provide an adequate basis for Professor Vandell's conclusion.

48. In a multinomial logit regression, the coefficient estimates can only be interpreted in terms of relative probabilities. To reach conclusions about the effects of a variable on probabilities themselves, one would need to calculate its marginal effect. My team performed the appropriate computations using Professor Vandell's multinomial cross-sectional model and found that the probability of default is, on average, approximately 9.8 percent higher for Hunter

Defective Loans as compared with otherwise identical loans that are not Hunter Defective Loans, and that the difference in default rates is statistically significant. Thus, when Professor Vandell's results are properly analyzed, they show that after accounting for disclosed loan characteristics and market changes, there is a statistically significant difference in default and serious delinquency rates, contrary to Professor Vandell's conclusion.

B. Professor Vandell's Multinomial Cross-Sectional Logit Model Is Mis-Specified

49. Professor Vandell's multinomial cross-sectional logit model includes independent variables that control for differences in loan and borrower characteristics and macroeconomic conditions. However, Professor Vandell also includes "Security Indicators" that should not be included in a default model. Not surprisingly, Professor Vandell did not include security indicators in the default models that he estimated using his now-excluded benchmarks, even though those benchmarks also consist of securitized loans. *See* Vandell Report, ¶¶ 191-196; **PX 1957** (Vandell Ex. 55); **PX 1968** (Vandell Ex. 57A); **PX 1969** (Vandell Ex. 58A); and **DX 1091** (Vandell Ex. 63A, Updated).

50. Professor Vandell's inclusion of these Security Indicators in his multinomial cross-sectional logit model is inappropriate for two reasons. First, the probability that a borrower will default on any particular loan does not depend on the securitization (if any) into which the loan is placed because, as a general matter, a borrower will not even know whether his loan has been securitized, let alone what securitization it backs. Second, the estimated coefficients on the Security Indicators may reflect the effects of underwriting defects, not factors unrelated to the alleged misstatements and omissions.

51. For these reasons, I estimated a multinomial cross-sectional logit model that has the same specification as Professor Vandell's in all other respects, but does not include

Security Indicators. **Plaintiff's Exhibit 1411** (Schwert Rebuttal Ex. O, Updated) reports the estimated coefficients for this model. As the exhibit shows, underwriting defects are associated with a significantly higher likelihood of default, and a lower likelihood of prepayment. This implies that loans with underwriting defects have higher default rates, all else equal. The estimates from this model imply that for the Hunter Defective Loans the probability of default is, on average, approximately 9.6 percent higher compared with otherwise identical loans that are not Hunter Defective Loans, and that the difference in default rates is statistically significant. In other words, contrary to Professor Vandell's claim, when analyzed using a properly specified model, the data show that the loans Hunter identified as defective did have significantly higher default rates.

52. **Plaintiff's Exhibit 1412** (Schwert Rebuttal Ex. P, Updated) compares the *actual* default rates of the loans in the Hunter Sample by SLG with the *expected* default rates of otherwise identical non-defective loans based on this model. The exhibit shows that the actual default rate is significantly higher than the expected default rate for the Hunter Sample as a whole and for five of the seven At-Issue SLGs. (The actual default rate is higher than the expected default rate for all seven At-Issue SLGs.) Thus, these findings show the loans Hunter identified as defective did have significantly higher default rates, contrary to Professor Vandell's conclusion.

C. PROFESSOR VANDELL IGNORES THE RELATION BETWEEN SUBORDINATION AND THE CREDIT RISK OF A SECURITIZATION'S SUPPORTING LOAN GROUP(S)

53. As I explained previously, there is a relation between the subordination level of securitizations and the various factors that affect the credit risk of loans in the supporting loan group(s) of those securitizations, including the loan-to-value ratio of those loans and the occupancy status of those loans. *See* ¶¶ 9-14, *supra*. Like me, Professor Vandell recognizes that

the senior-subordinate structure of the Securitizations provided investors who purchased the more senior tranches (such as the GSEs) with “protection against losses suffered by the underlying mortgage pool.” *See* Vandell Report ¶ 24; Vandell Direct ¶ 25. Professor Vandell also recognizes that “the risk of default has been found to be closely related to certain loan, property, and borrower characteristics” including among others, the LTV ratio, and the borrower’s occupancy status. *See* Vandell Report ¶¶ 27, 28, 31, 33 & 37; Vandell Direct ¶ 32. For these reasons, Professor Vandell included CLTV, occupancy status, and other loan and borrower characteristics that are known to affect the risk of loans in his multinomial logit default regression model. *See* Vandell Direct ¶ 150 & **DX-1089**. Moreover, Professor Vandell found that both CLTV and occupancy status are statistically significantly related to the likelihood of default. *See* **DX-1089**. In these respects, Professor Vandell’s analysis of the economics of subordination and the factors that affect the credit risk of loans in a securitization’s supporting loan group is consistent with my own.

54. Professor Vandell claims that if the alleged underwriting defects did not affect the performance of the loans in the Supporting Loan Groups for the GSE Certificates, then the losses suffered by Freddie Mac and Fannie Mae as holders of the GSE Certificates could not have been caused by any of the alleged misrepresentations and omissions. *See* Vandell Direct ¶¶ 16, 145, 154 & 181. But this claim ignores the relation between subordination and perceived credit risk. As explained above, if the Prospectus Supplements had reported higher LTV ratios, and higher percentages of properties not occupied by their owners, the GSE Certificates would likely have had higher subordination levels. This conclusion is critical to the analysis of loss causation because the losses on any GSE Certificate that has become impaired or will become

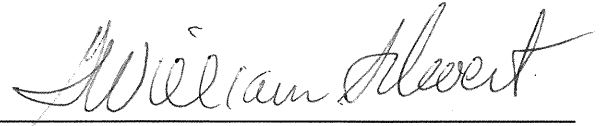
impaired as a result of losses in its SLG would have been lower if the subordination level of that certificate had been higher.

55. The relation between subordination and losses can be illustrated with a simple example as shown in **Plaintiff's Exhibit 1743** (Schwert Rebuttal Ex. C). Suppose that a securitization was issued with an AAA subordination level of 20 percent (*i.e.*, the principal amount of the AAA-rated tranche was equal to 80 percent of the principal amount of its SLG on the issue date). Further suppose that the losses in the SLG for this tranche total 40 percent of the SLG's original principal value. The losses in the SLG would cause the value of the certificates from the AAA tranche to decline by 25 percent of original principal value (*i.e.*, from 80 percent of the original principal value of the loans to 60 percent of the original principal value of the loans, which is 100 percent of the remaining principal value of the loans). Now suppose that in the absence of misstatements and omissions, the AAA subordination level would have been 40 percent. Under those circumstances, even though the underlying loans would have had the same losses, there would have been no loss to the AAA tranche. Therefore, all of the AAA tranche's losses in this example are caused by the misstatements and omissions regardless of how the SLG would have performed had it been comprised of non-defective loans.

56. Professor Vandell does not quantify the additional losses that have resulted from inappropriate subordination levels of the GSE Certificates. Therefore, even if his analysis had shown that the losses on the At-Issue Loans were not attributable to the alleged underwriting defects (which it has not), his analysis would not establish that the alleged misrepresentations and omissions did not cause any of the losses on the GSE Certificates.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is a true and correct statement of my opinions in this Action.

Executed on this 30th day of March, 2015 in New York, New York.

A handwritten signature in cursive script, reading "William Schwert", written in black ink. The signature is positioned above a horizontal line.

G. William Schwert